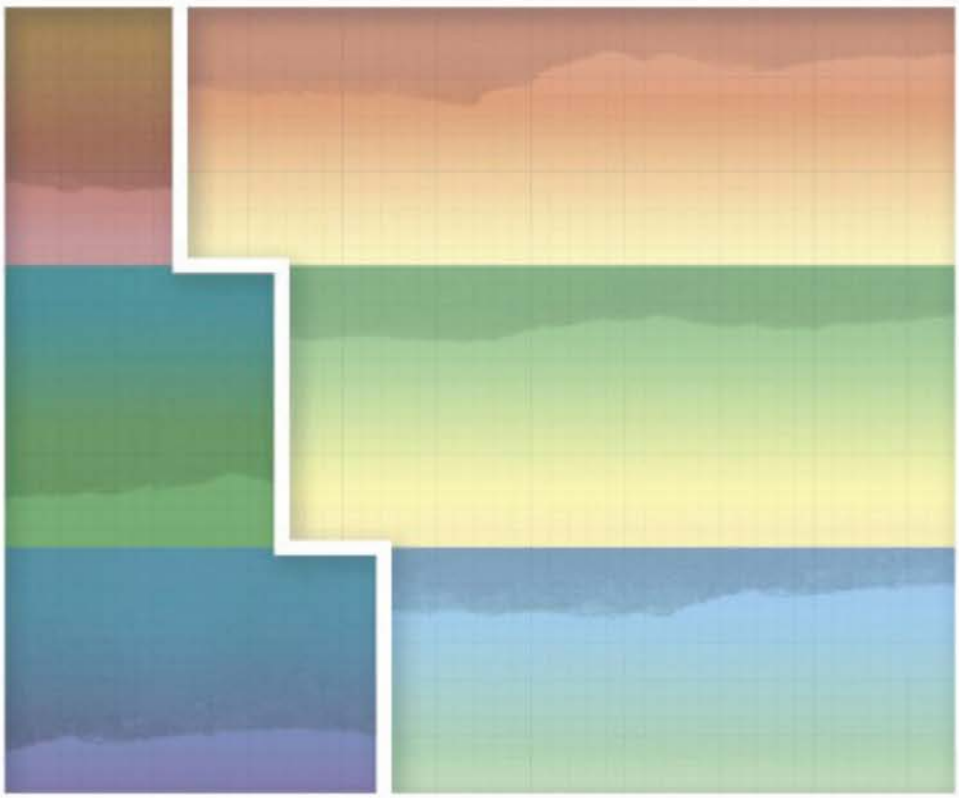
Applied Behavior Analysis

Third Edition



John O. Cooper ▵ Timothy E. Heron ▵ William L. Heward

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John O. Cooper

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All, The Ohio State University

Pearson

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This book is dedicated to Jack Michael, whose extraordinary contributions to behavior analysis will continue to benefit those who teach and practice the science and, most importantly, those whose learning is enhanced by its application.

Photo credit: Amber Hutson.

Jack L. Michael

*"One might ask why it is of any value to be able to recognize and correctly name these various effects. I would answer that I have found, for myself at least, that I cannot understand some things unless I can talk about them clearly."**

*From "What Every Student of Behavior Analysis Ought to Learn: A System for Classifying the Multiple Effects of Behavioral Variables," by J. Michael, 1995, *The Behavior Analyst, 18*, p. 284.

ABOUT THE AUTHORS

Photo credit: Jill C. Dardig.

Tim Heron (left), John Cooper (center), and Bill Heward (right)

John Cooper, Tim Heron, and Bill Heward were faculty members at The Ohio State University for a combined 90 years. Together they trained special education classroom teachers and leadership personnel guided by the philosophical, scientific, and technological principles of applied behavior analysis. The Ph.D. program in special education and applied behavior analysis that they and their colleagues developed at OSU was the first doctoral program accredited by the Association for Behavior Analysis International. John, Tim, and Bill each received the Alumni Award for Distinguished Teaching, OSU's highest honor for teaching excellence. They are joint recipients of the Ellen P. Reese Award for Communication of Behavioral Concepts from the Cambridge Center for Behavioral Studies.

John O. Cooper, Ed.D., is Professor Emeritus in the College of Education and Human Ecology at The Ohio State University. His research and teaching interests include precision teaching, inner behavior, fluency building, and verbal behavior. He is a past president of the Standard Celeration Society, past member of the Board of Directors for the Society for the Advancement of Behavior Analysis, and Applied Representative to the Executive Council and as Chairperson, Graduate Program Accreditation Committee of the Association for Behavior Analysis International.

Timothy E. Heron, Ed.D., is Professor Emeritus in the College of Education and Human Ecology at The Ohio State University. Tim's research interests include tutoring systems, inclusion of students with disabilities in general education classrooms, consultation, and self-correction instructional approaches. Tim is co-author of *The Educational Consultant: Helping Professionals, Parents, and Students in Inclusive Classrooms*, Fourth Edition (with Kathleen Harris, 2001). Since 2000, Tim has been an active Federal Aviation Administration, Gold Seal Certified Flight Instructor; has authored the text *Instrument Flying: 10 Indispensable Principles to Know and Remember*; and continues to apply the principles and procedures of applied behavior analysis to the next generation of aviators.

William L. Heward, Ed.D., BCBA-D, is Professor Emeritus in the College of Education and Human Ecology at The Ohio State University. Bill's interests include "low-tech" methods for increasing the effectiveness of group instruction and promoting the generalization and maintenance of newly learned skills. He has authored or co-authored five other books, including *Exceptional Children: An Introduction to Special Education,* Eleventh Edition (with Sheila Alber-Morgan and Moira Konrad, 2017), and *Sign Here: A Contracting Book for Children and Their Parents* (with Jill C. Dardig, 2016). A Fellow and Past President of the Association for Behavior Analysis International, Bill is a recipient of the Fred S. Keller Behavioral Education Award from Division 25 of the American Psychological Association and the Distinguished Psychology Department Alumnus Award from Western Michigan University.

CHAPTER CONTRIBUTORS

Thomas S. Critchfield, Ph.D., is Professor of Psychology at Illinois State University. He earned his doctorate in Behavior Analysis from West Virginia University and completed a post-doctoral fellowship at the Johns Hopkins University School of Medicine. A Fellow and Past President of the Association for Behavior Analysis International and of Division 25 of the American Psychological Association, Tom has served as Associate Editor for the *Journal of the Experimental Analysis of Behavior*, *Perspectives on Behavior Science, Mexican Journal of Behavior Analysis,* and *Conch Republic Archives of Psychology.* His interests include derived stimulus relations, punishment and negative reinforcement, effective instruction, and the process of bench-to-bedside scientific translation.

Thomas R. Freeman, M.S., BCBA, is Senior Vice President of ABA Technologies, Inc., where he focuses on the dissemination of behavioral science, in part by helping create curricula and instructional materials for the Florida Institute of Technology ABA Online program. With nearly 40 years of experience in ABA, Tom has held various clinical, supervisory, and administrative positions in Massachusetts and Florida. He has also participated in animal behavior studies with orangutans in Borneo and Hawaiian spinner dolphins, and was Field Director of the University of Hawaii's Humpback Whale Project. Tom is dedicated to applying behavior analysis to mainstream social needs (e.g., general education, environmental issues) and common individual challenges (e.g., anxiety, depression, and grief), and is particularly interested in coordinating ABA and psychiatric services, identifying practices as evidence-based (or not), and studying the evolution of ethics.

Brian A. Iwata, Ph.D., is Distinguished Professor of Psychology and Psychiatry at the University of Florida. He and his students have published over 250 articles and chapters on disorders of learning and behavior and on functional analysis methodology. Brian is a former editor of the *Journal of Applied Behavior Analysis* and past president of the Association for Behavior Analysis International, Division 33 of the American Psychological Association, the Society for the Advancement of Behavior Analysis, the Society for the Experimental Analysis of Behavior, and the Florida Association for Behavior Analysis. He has chaired study sections for both NIH and NIMH and is a fellow of the American Association on Intellectual and Developmental Disabilities, the American Psychological Association, the Association for Behavior Analysis International, and the Association for Psychological Scien ce. In 2015, he received the Gold Medal for Lifetime Achievement in the Application of Psychology from the American Psychological Association.

Linda A. LeBlanc, Ph.D., BCBA-D, Licensed Psychologist, is President of LeBlanc Behavioral Consulting. She received her Ph.D. in 1996 from Louisiana State University. She previously taught at Claremont McKenna College, Western Michigan University, and Auburn University, and was Executive Director of Trumpet Behavioral Health. Her research interests focus on behavioral treatment of autism, technology-based behavioral interventions, behavioral gerontology, supervision and mentorship, and systems development in human services. Dr. LeBlanc has been an associate editor for *Behavior Analysis in Practice, The Analysis of Verbal Behavior,* and the *Journal of Applied Behavior Analysis.* She has been a senior editor for *Education and Treatment of Children* and will serve as the editor of the *Journal of Applied Behavior Analysis* from 2020 to 2022. Linda is the 2016 recipient of the American Psychological Association Nathan H. Azrin Award for Distinguished Contribution in Applied Behavior Analysis, and a fellow of the Association of Behavior Analysis International.

Jose Martinez-Diaz, Ph.D., BCBA-D, is Professor and Director of the School of Behavior Analysis at the Florida Institute of Technology, and CEO of ABA Technologies, Inc., an instructional design and technology company. He earned his doctorate in clinical psychology with an emphasis in behavior analysis and therapy from West Virginia University. Jose's principal areas of interest are practitioner training, professional and ethical issues, instructional design and technology, organizational behavior management, and the conceptual analysis of behavior. A past president of the Florida Association of Behavior Analysis (FABA), Jose has served on the board of directors for the Behavior Analyst Certification Board, the Association of Professional Behavior Analysts (APBA), and the Cambridge Center for Behavioral Studies. Awards recognizing Jose's contributions to effective and ethical practice of behavior analysis include the APBA's Jerry Shook Award and FABA's Charles H. Cox Award for Outstanding Service and Advancement of Behavior Analysis in Florida.

Jack Michael, Ph.D., is Professor Emeritus in the Department of Psychology at Western Michigan University, where he taught for 36 years. His primary scholarly interests are verbal behavior, basic theory regarding motivation, and the technical terminology of behavior analysis. Jack contributed to the founding of the Association for Behavior Analysis International and served as its third president. His publications include the highly acclaimed text *Concepts and Principles of Behavior Analysis* (2004). A Fellow of the Association for Behavior Analysis International and the American Psychological Association, Dr. Michael has received many honors and recognitions, including the Distinguished Service to Behavior Analysis Award from the Association for Behavior Analysis, the 2002 Don Hake Award for Translational Research from Division 25 of the American Psychological Association, the 2012 Victor Laties Lifetime of Service Award from the Society for the Experimental Analysis of Behavior, and Western Michigan University's top two faculty honors: Distinguished Faculty Scholar Award and Distinguished Teaching Award. In 2012, Jack was the first recipient of an award named in his honor by the Verbal Behavior Special Interest Group affiliated with ABAI.

Caio F. Miguel, Ph.D., BCBA-D, is Professor of Psychology at California State University, Sacramento. His research interests span basic, applied, and conceptual issues in the study of motivation, verbal behavior, covert mediation, and derived stimulus relations. Caio has served as editor of *The Analysis of Verbal Behavior* and associate editor for the *Journal of Applied Behavior Analysis*. His publications have appeared in English, Portuguese, and Spanish language journals, and he has given hundreds of professional presentations throughout North America, South America, and Europe. Caio received the 2013–2014 Award for Outstanding Scholarly Work from the College of Social Sciences and Interdisciplinary Studies at CSU Sacramento, and the 2014 Outstanding Mentor Award by the Student Committee of the Association for Behavior Analysis International.

Nancy A. Neef, Ph.D., is Professor Emeritus in the College of Education and Human Ecology at The Ohio State University. She has served as editor of the *Journal of Applied Behavior Analysis,* as president of the Society for the Experimental Analysis of Behavior, and on the Executive Council and as chair of the publication board for the Association of Behavior Analysis International. Nancy has published more than 60 articles and chapters in the areas of developmental disabilities, research methodology, and instructional technology. Much of her research has focused on extensions and applications of basic research in the assessment and treatment of attention-deficit hyperactivity disorder. Nancy was the recipient of the first Distinguished Alumnus Achievement Award in Psychology from Western Michigan University and the 2006 Award for Outstanding Research in Applied Behavior Analysis from Division 25 of the American Psychological Association.

Stephanie M. Peterson, Ph.D., BCBA-D, is Professor and Chair of the Department of Psychology at Western Michigan University. Her primary research interests are choice and concurrent schedules of reinforcement in the treatment of severe problem behavior and in the functional analysis of problem behavior. Stephanie also has interests in applications of behavior analysis to educational interventions and teacher training. She has served on the editorial boards of the *Journal of Applied Behavior Analysis* and *The Behavior Analyst* and currently serves as a consulting senior editor for *Education and Treatment of Children*. She is a former member of the Board of Directors for the Behavior Analyst Certification Board.

Carol Pilgrim, Ph.D., is Professor of Psychology at the University of North Carolina, Wilmington. Her primary research interests are in the analysis, application, and conceptual treatment of relational stimulus control, particularly stimulus equivalence. Carol is a former editor of *The Behavior Analyst* and associate editor of the *Journal of the Experimental Analysis of Behavior* and *The Behavior Analyst.* She has served as President of the Association for Behavior Analysis International (ABAI), the Society for the Advancement of Behavior Analysis, Division 25 of the American Psychological Association (APA), and the Southeastern Association for Behavior Analysis. Carol is a fellow of ABAI and Division 25 of APA, and she has been honored with the North Carolina Board of Governors Teaching Excellence Award (2003), the UNCW Faculty Scholarship Award (2000) and Graduate Mentor Award (2008), and the ABAI Student Committee Outstanding Mentor Award (2006) and Distinguished Service to Behavior Analysis Award (2017).

Ruth Anne Rehfeldt, Ph.D., BCBA-D, is Professor of Behavior Analysis and Therapy at Southern Illinois University. She completed her Ph.D. at the University of Nevada. Dr. Rehfeldt has published over 100 articles and book chapters in behavior analysis, primarily on basic and applied investigations of verbal behavior and derived relational responding, relational frame theory, and acceptance and commitment therapy. Ruth Anne served as the editor and business manager for *The Psychological Record* for 12 years. She is or has been an editorial board member for a number of behavior analytic journals, including *Journal of Applied Behavior Analysis, Journal of the Experimental Analysis of Behavior,* and *The Analysis of Verbal Behavior*. She has held a number of leadership positions within the Association for Behavior Analysis International. Dr. Rehfeldt has won a number of teaching and research awards during her tenure at Southern Illinois University.

Richard G. Smith, Ph.D., BCBA-D, LBA-TX, is Associate Professor in the Department of Behavior Analysis at the University of North Texas, where he served as Department Chair for 13 years. Rick received his master's and doctoral degrees at the University of Florida. His primary research interest is in the assessment and treatment of behavior disorders in persons with developmental disabilities, with specific areas of focus in motivational variables and advances in functional analysis procedures. A former associate editor for the *Journal of Applied Behavior Analysis,* Rick's work has been recognized with the American Psychological Association's Division 25 B. F. Skinner Award for Innovative and Important Research by a New Researcher (1997), the Texas Chapter of the American Association on Intellectual and Developmental Disabilities' Research Award (2000), the Texas Association for Behavior Analysis' Career Contributions to Behavior Analysis in Texas Award (2014), and the University of North Texas President's Special Faculty Recognition Award (2017).

Mark L. Sundberg, Ph.D., BCBA-D, is a Licensed Psychologist in private practice. He specializes in language research and the development of language assessment and intervention programs for children and adults with language delays. Mark is founder and past editor of the journal *The Analysis of Verbal Behavior,* a past president of The Northern California Association for Behavior Analysis, and a past chair of the Publication Board of the Association for Behavior Analysis International, and has served on the Board of Directors of the B. F. Skinner Foundation. Mark is the author of *The Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP),* and co-author (with James W. Partington) of the books *Teaching Language to Children with Autism or Other Developmental Disabilities* and the original *Assessment of Basic Language and Learning Skills: The ABLLS.* Mark has received several awards, including the 2001 Distinguished Psychology Department Alumnus Award from Western Michigan University and the 2013 Jack Michael Outstanding Contributions in Verbal Behavior Award from ABAI's Verbal Behavior Special Interest Group.

PREFACE

As it was 17 years ago, when we began writing the previous edition of this book, our overriding goal for the third edition was to produce an accurate, comprehensive, and contemporary description of applied behavior analysis. The result is a text that demands concentrated and serious study.

Despite its size, scope, and in-depth treatment of concepts, principles, procedures, and issues, *Applied Behavior Analysis, Third Edition*, should be viewed as an introductory text for two reasons. First, the reader need not possess any specialized prerequisite knowledge to understand the content. Second, attaining a full understanding of applied behavior analysis requires considerable study and guided experience beyond this text. There is no topic presented within these pages that has not been treated in greater depth elsewhere. Students of applied behavior analysis should build upon what they learn from this book by reading other sources. How much reading is needed to fully grasp and appreciate applied behavior analysis? Don Baer (2005), one of the co-founders of applied behavior analysis, estimated that

> [T]he cost of knowing well the basic principles and paradigms of the theoretical and experimental aspects of behavior analysis would require about 2,000 pages and some laboratory experience. ABA shares the same basic principles with the theoretical and experimental branches of behavior analysis and adds to them an even larger number of secondary principles, strategies, and tactics for making those basic principles work in the real world as they do in the laboratory. ABA also adds a set of principles about ethical and humane practice, prominent among which is the need to be certain, through constant and extensive measurement and experimentation, that the particular case in hand is going well and will continue to go well—because it will change as it progresses. The cost of knowing all that is, I estimate, about 3,000 pages of reading and several years of supervised practical experience. (pp. 27–28)

The field has grown markedly since its formal inception in 1968, so much so that Baer's 3000-page reading assignment might now exceed 4000 pages, or more. We trust that this book's 800-plus pages will contribute to Baer's reading assignment for many future behavior analysts. Specific suggestions for additional readings in applied behavior analysis and in the conceptual and basic research branches of behavior analysis are cited throughout this text.

Again, while our objective is to provide a complete description of the principles and procedures for changing and analyzing socially important behavior, mastery of this book's content represents the beginning, not the end, of one's study of applied behavior analysis. If our efforts as textbook writers and chapter contributors, combined with those of instructors who assign this book, are successful, the dedicated student will come away with a sound repertoire of fundamental knowledge about applied behavior analysis. In turn, this knowledge will serve as the foundation for more advanced study and supervised practica that ultimately will lead to independent efforts to change and understand behavior that are scientifically sound, socially significant, and ethically appropriate.

TERMINOLOGY

Meaningful description of any scientific activity necessitates a standard set of technical terms. Effectively communicating the design, implementation, outcomes, and/or theoretical bases of an applied behavior analysis requires the accurate use of the discipline's terminology. Throughout this text, we have made every effort to define and use behavior analytic terminology in a conceptually systematic and consistent manner. Mastering the specialized vocabulary of applied behavior analysis is an important initial step in embracing the science and participating effectively as a researcher, practitioner, or consumer. We encourage students to study the field's terminology with diligence. Toward that end, the third edition includes a glossary of more than 500 technical terms and concepts.

REFERENCES, EXTRACTS, FOOTNOTES, AND GRAPHS

An important function of any introductory text to a scientific discipline is to expose students to the empirical and conceptual literature of that field. This edition contains more than 2700 citations to primary-source publications, including historically important experiments (e.g., the first graph presented by B. F. Skinner in his 1938 book *The Behavior of Organisms*), and classic and contemporary examples of applied behavior analysis research—most of which were published in the field's flagship journal, the *Journal of Applied Behavior Analysis.* We also make extensive use of quotations and extracts from key publications representing the conceptual literature. We have done this not only for the historical and/or technical authority these authors provide, but also because their inclusion increases students' exposure to and appreciation for the field's rich primary-source literature.

The third edition includes more than 150 graphs of data from peer-reviewed research, many of which are accompanied by detailed descriptions of the study's methodology. We have a fourfold purpose for providing many procedures, graphs, and references. First, we want to illustrate behavior analysis principles and procedures with actual applications and real data, not hypothetical examples. Second, reading the procedural descriptions will help students appreciate the high degree of technical precision and control of complex environments that researchers and practitioners must achieve to solve problems and show functional relations between variables. Third, the references provide students whose interests are piqued by the descriptions or graphs with directions to the original studies for more in-depth study. Finally, the graphs provide multiple opportunities for students to develop and refine—through practice and discussion with their instructors, mentors, and fellow students—higher-level visual analysis skills.

THIRD EDITION CONTENT ENHANCEMENTS AND FEATURES

Applied behavior analysis has become more mature and sophisticated since the second edition was published. Although the basic principles of behavior remain unchanged, advances in all three interrelated domains of the science of behavior—theoretical, basic research, and applied research—have improved our understanding of those principles and led to increased effectiveness in developing and applying effective and humane behavior change interventions. These developments are reflected in the more than 1,000 new references to the conceptual, basic, and applied literatures of behavior analysis added to this edition.

Chapters by Outstanding Authors

The third edition includes seven chapters authored by prominent scholars in applied behavior analysis. This group of contributors includes the current and two former editors of the *Journal of Applied Behavior Analysis,* two previous editors of *The Analysis of Verbal Behavior,* and associate editors of the *Journal of the Experimental Analysis of Behavior*. Members of this well-known and prolific group of behavior analysts first reported some of the most significant advances in behavior analysis in publications.

Negative Reinforcement

In Chapter 12, Negative Reinforcement, Rick Smith and Brian Iwata present an authoritative account of this commonly misunderstood and misapplied form of reinforcement. In addition to precisely defining this principle, dispelling misconceptions about it, and illustrating applications across a broad spectrum of cases, Smith and Iwata provide specific guidelines for incorporating negative reinforcement into behavior change interventions.

Motivation

Until recently, motivation, a major topic in psychological theories and everyday explanations of behavior, has been an assumed, but inadequately understood, topic in behavior analysis. Due largely to the work of Jack Michael, behavior analysts now have a much better understanding of motivation and its role within applied behavior analysis. In Chapter 16, Motivating Operations, Jack Michael and Caio Miguel explain how certain antecedent events have dual motivating effects: a behavior-altering effect, which makes certain behaviors more (or less) likely; and a value-altering effect, which makes certain events more (or less) effective as reinforcement.

Verbal Behavior

In Chapter 18, Verbal Behavior, Mark Sundberg contrasts B. F. Skinner's functional analysis of verbal behavior with traditional approaches to language, defines and gives examples of basic types of elementary verbal operants (e.g., mands, tacts, intraverbals), and describes implications and applications for these concepts in designing and implementing language intervention programs.

Equivalence-based Instruction

In Chapter 19, Equivalence-based Instruction, Carol Pilgrim builds upon Sidman's groundbreaking research on stimulus equivalence to explain the conditions in which learners acquire new skills and verbal relations without direct instruction on those skills. Pilgrim defines equivalence-based instruction, describes its key outcomes—class formation, delayed emergence, class expansion and class merger, transfer of function, and contextual control—and shows how lessons can be designed to promote those outcomes.

Nonequivalence Relations

In Chapter 20, Engineering Emergent Learning with Nonequivalence Relations, Tom Critchfield and Ruth Anne Rehfeldt explain how people make sense of and function effectively in a world of arbitrary relations in which stimuli "go together," not because they share physical properties, but rather because social-verbal reinforcement contingencies teach people to relate them in a certain way. Relational frame theory (RFT) and acceptance and commitment therapy (ACT), a therapeutic approach grounded in RFT, are described.

Functional Behavior Assessment

In Chapter 27, Functional Behavior Assessment, Stephanie Peterson and Nancy Neef describe one of the more significant developments in applied behavior analysis. Functional behavior assessment has become a well-established method for discovering the function that a problem behavior serves for a person (e.g., to obtain social attention, to avoid an assigned task, to provide sensory stimulation), information that enables practitioners to design interventions that teach adaptive replacement behaviors that serve the same function.

Ethics

In Chapter 31, Ethical and Professional Responsibilities of Applied Behavior Analysts, Tom Freeman, Linda LeBlanc, and Jose Martinez-Diaz clarify what ethical behavior is, explain why ethical behavior is a necessary part of the applied behavior analyst's repertoire, review ethical codes of conduct for behavior analysts, and describe specific procedures for ensuring and assessing ethical practice. New content regarding client services (e.g., informed consent, conflict of interest) and, importantly, ethical implications of new technologies, social media, and professional networking to support ethical behavior is presented.

Text Content Related to the Behavior Analyst Certification Board® BCBA® & BCABA® Behavior Analyst Task List© Fifth Edition

The Behavior Analyst Certification Board® (BACB®) is a nonprofit corporation established in 1998 to meet professional credentialing needs identified by behavior analysts, governments, and consumers of behavior analysis services. To be certified as a Board Certified Behavior Analyst® (BCBA®) or a Board Certified Assistant Behavior Analyst® (BCaBA®), a person must meet academic-degree, educational, and practical-experience eligibility requirements and then pass a psychometrically

sound examination. The BCBA and BCaBA examinations are based on the *BCBA/BCaBA Task List* (5th ed.; BACB, 2017a), which was developed by 16 subject matter experts and subsequently content validated through a survey of more than 6000 BACB certificants (BACB, 2017b). The complete *BCBA/BCaBA Task List* (5th ed.) is printed inside the front and back covers of this text.

We have connected the content of this text to the tasks that the BACB determined are necessary to function as an entry-level behavior analyst. A chart at the beginning of each chapter identifies which Task List items are covered within that chapter. Due to the complex nature of applied behavior analysis, in which the concepts and principles and their application are interrelated and not easily or effectively presented in a linear fashion, some Task List items are covered in more than one chapter. Students studying for BCBA and BCaBA examinations can look up key words from Task List items in the Subject Index to identify the page numbers where relevant information about each item in the *BCBA/BCaBA Task List* (5th ed.) can be found.

This text presents the basic knowledge that a qualified behavior analyst must possess. Although mastering this content will help you obtain a passing score on the BCBA or BCaBA examinations, two important qualifiers must be recognized. First, the BCBA and BCaBA examinations require knowledge beyond that included in this, or any, single textbook. Therefore, to further prepare for the examinations we encourage students to study original sources, engage in supervised practica, and discuss areas of personal interest with trusted and competent mentors. Second, no matter how accurate, extensive, and current this textbook may be, and no matter how thoroughly a student masters its content, he or she will not be fully qualified to function as a behavior analyst. Successful completion of the required coursework in behavior analysis is but one step in the preparation to become a BCBA or a BCaBA. For the most recent information on the BACB requirements, visit the Behavior Analyst Certification Board's website at www.BACB.com.

Behavior Analyst Certification Board. (2017a). *BCBA/BCaBA task list (5th ed.).* Littleton, CO: Author.

Behavior Analyst Certification Board. (2017b, January). *BACB newsletter.* https://www.bacb.com/wp-content/uploads/170113-newsletter.pdf

TEXT ORGANIZATION AND STRUCTURE

The book's 31 chapters are organized into 13 parts. The two chapters in Part 1 describe some tenets that are fundamental to all scientific endeavors, outline a history of behavior analysis as a natural science approach to understanding behavior, define applied behavior analysis, and describe principles and concepts of that science. Parts 2 and 3 examine the elements necessary for an applied behavior analysis. Part 2 presents considerations, criteria, and procedures for selecting, defining, and measuring *applied behavior.* The five chapters in Part 3 examine the logic and operation of specific tactics for the experimental *analysis* of behavior–environment relations, and some issues in planning, replicating, and evaluating analyses of behavior.

The seven chapters in Parts 4 through 6 explore the two most significant principles of behavior—reinforcement and punishment; how antecedent events alter one's motivation to respond; and how behavior comes under the discriminative control of environmental conditions. Part 7 is a detailed examination of B. F. Skinner's analysis of verbal behavior and its implications and applications for language development. The five chapters in Part 8 describe how applied behavior analysts use equivalence-based instruction, nonequivalence relations, imitation, modeling, observational learning, shaping, and chaining to develop new skills and patterns of behavior from simple to complex.

Part 9 details how problem behaviors can be decreased with nonpunishment interventions: extinction, differential reinforcement, and antecedent interventions. Part 10 describes functional behavioral assessment, sophisticated methods for determining the purpose that problem behavior serves for a person, and important information that leads to the design of treatments that replace the problem behavior with adaptive alternative behavior serving the same function.

Part 11 describes four special applications of behavior change technology: token economy, contingency contracting, group contingencies, and self-management. Part 12 outlines strategies and tactics for increasing the likelihood that efforts to change behavior yield generalized outcomes: behavior changes that maintain across time, occur in appropriate settings and situations beyond the training setting, and spread to other useful behaviors. The book's final part describes ethical and professional responsibilities of behavior analysts, ethical implications of new technologies, social media, and professional networking.

SUPPLEMENTS AND RESOURCES FOR STUDENTS AND INSTRUCTORS

Instructor's Resource Manual and Test Bank (ISBN 0-13-481312X)

An Instructor's Resource Manual includes suggestions for learning activities, additional Experiencing Firsthand exercises, supplementary lectures, case study analyses, discussion topics, group activities, and additional media resources. The *Test Bank* that accompanies this text contains both multiple-choice and essay questions. Some items (lower-level questions) simply ask students to identify or explain concepts and principles they have learned. But many others (higher-level questions) ask students to apply those same concepts and principles to specific classroom situations—that is, to actual student behaviors and teaching strategies.

Powerpoint® Slides (ISBN 0-13-4752643)

The PowerPoint slides include key concept summarizations, diagrams, and other graphic aids to enhance learning. They are designed to help students understand, organize, and remember core concepts and theories.

Acknowledgments

The third edition of *Applied Behavior Analysis* is the product of the collective and cumulative efforts of many people. Although space limitations prevent us from thanking everyone by name, we would like to acknowledge those who made substantial contributions to the book's content or production during the 3 years we spent revising the text. First and foremost, we are deeply grateful to the authors of the seven contributed chapters: Rick Smith and Brian Iwata (Negative Reinforcement); Jack Michael and Caio Miguel (Motivating Operations); Mark Sundberg (Verbal Behavior); Carol Pilgrim (Equivalence-based Instruction); Tom Critchfield and Ruth Anne Rehfeldt (Engineering Emergent Learning with Nonequivalence Relations); Stephanie Peterson and Nancy Neef (Functional Behavior Assessment); and Tom Freeman, Linda LeBlanc, and Jose Martinez-Diaz (Ethical and Professional Responsibilities of Applied Behavior Analysts). Because of their efforts, third edition readers will be introduced to important topics in applied behavior analysis by scholars whose research has helped to define and develop those areas.

We thank the Behavior Analyst Certification Board (BACB) for allowing us to integrate the Behavior Analyst Certification Board® BCBA/BCaBA Task List (5th ed.) throughout the revised edition of our text. We are especially grateful to Jim Carr, Chief Executive Officer of the Behavior Analyst Certification Board. Jim graciously continued the arrangement with the BACB we first developed with Jerry Shook for the second edition.

In-depth reviews of the second edition by Jan Montgomery (Florida Institute of Technology), Bethany Raiff (Rowan University), Corey Robertson (Florida Institute of Technology), Tina Sidener (Caldwell University), and Carlos A. Zuluaga (Florida Institute of Technology) offered helpful recommendations for improvement that we incorporated into this edition. The third edition is also enhanced by input and assistance from the following colleagues: Bill Ahearn (New England Center for Children), Sheila Alber-Morgan (The Ohio State University), Nikolay Alipov (Russian National Investigation Medical University), Fernando Armendariz (FABA, Inc.), Judah Axe (Simmons College), Vince Carbone (The Carbone Clinic), Sharon Chien (SEEK), Darlene Crone-Todd (Salem University), Alyce Dickinson (Western Michigan University), Anca Dumitrescu (ATCA, Romania), Ronnie Dietrich (Wing Institute), Tim Hackenberg (Reed College), Louis Hagopian (Kennedy Krieger Institute), Rob Holdsambeck (Cambridge Center for Behavioral Studies), Mickey Keenan (Ulster University, Northern Ireland), Tracy Kettering (Bancroft), Jonathan Kimball (private practice, Maine), Moira Konrad (The Ohio State University), Douglas Kostewicz (University of Pittsburgh), Rick Kubina (Penn State University), Ed Morris (University of Kansas), Dave Palmer (Smith College), Robert Ross (Beacon ABA Services), Hank Schlinger (California State University, Los Angeles), Majda Seuss (Association for Behavior Analysis International), and Janet Twyman (Center for Innovations in Learning).

Turning more than 2500 pages of manuscript into the book you are holding required the support and contributions of a talented team of publishing professionals at Pearson. Copy editor Joanne "Bonnie" Boehme's talent in turning rough prose into clear and understandable text is evident on every page. The bumpy spots that remain are our responsibility. Production Editor Clara Bartunek and Content Producer Janelle Rogers worked closely and patiently with us throughout. Ann Castel Davis, our former editor, was instrumental in convincing us to tackle this edition. We are grateful to Ann and to Director and Publisher Kevin Davis, for their long-standing commitment not only to this title but also to publishing books on behavior analysis and evidence-based practices in special education.

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PART 1

Introduction and Basic Concepts

We believe that prior to learning specific principles and procedures for analyzing and changing behavior, the student of applied behavior analysis should be introduced to the historical and conceptual foundations of the science. Basic knowledge and appreciation of the scientific and philosophical underpinnings of behavior analysis are requisites to a thorough understanding of the discipline's nature, scope, and potential. We also believe a preliminary overview of basic concepts, principles, and terminology makes the in-depth study of behavior analysis to follow more effective. The two chapters in Part 1 support these two beliefs. Chapter 1 describes the scientific, conceptual, and philosophical roots of applied behavior analysis and identifies the discipline's defining dimensions, characteristics, and overall goals. Chapter 2 defines the field's fundamental elements—behavior and the environmental antecedent and consequential events that influence it—and introduces key terms and principles that describe relationships among these elements.

CHAPTER 1

Definition and Characteristics of Applied Behavior Analysis

Key Terms

applied behavior analysis (ABA)
behaviorism
determinism
empiricism
experiment
experimental analysis of behavior (EAB)
explanatory fiction
functional analysis
functional relation
hypothetical construct
mentalism
methodological behaviorism
parsimony
philosophic doubt
pragmatism
radical behaviorism
replication
science

Behavior Analyst Certification Board BCBA/BCaBA Task List (5th ed.)	
Section 1: Foundations	
A. Philosophical Understandings	
A-1	Identify the goals of behavior analysis as a science (i.e., description, prediction, control).
A-2	Explain the philosophical assumptions underlying the science of behavior analysis (e.g., selectionism, determinism, parsimony, pragmatism).
A-3	Describe and explain behavior from the perspective of radical behaviorism.
A-4	Distinguish among behaviorism, the experimental analysis of behavior, applied behavior analysis, and professional practice guided by the science of behavior analysis.
A-5	Describe and define the dimensions of applied behavior analysis (Baer, Wolf, & Risley 1968).

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[S]ince I was a child I always found my biggest reinforcer was something called understanding. I liked to know how things worked. And of all of the things in the world there are to understand, it became clear to me that the most fascinating was what people do. I started with the usual physical science stuff, and it was intriguing to me to understand how radios work, and how electricity works, and how clocks work, etcetera. But when it became clear to me that we could also learn how people work—not just biologically, but behaviorally—I thought that's the best of all. Surely, everyone must agree that that's the most fascinating subject matter. That there could be a science of behavior, of what we do, of who we are? How could you resist that?

—Donald M. Baer in Heward & Wood, (2003, p. 302)

Applied behavior analysis is a science devoted to understanding and improving human behavior. Other disciplines have similar intents. What sets applied behavior analysis apart? The answer lies in its focus, goals, and methods. Applied behavior analysts focus on behaviors of social importance, they intervene with research-based strategies and tactics to improve the targeted behaviors, and they use scientific methods—objective description, measurement, and experimentation—to demonstrate reliable relations between their interventions and the behavioral improvements. In short, applied behavior analysis, or ABA, is a scientific approach for discovering environmental variables that reliably influence socially significant behavior and for developing a technology of behavior change that takes practical advantage of those discoveries.